



In the Specification

Please replace the paragraph beginning on page 15 at line 11 with the following paragraph:




The drilling process is illustrated for the first embodiment in Figs. 13 and 14. It can be viewed as beginning when the operator positions sequence switch 228 to the drilling position at step 608. The process then continues at step 610 of Fig. 13 with the operator performing the actual boring process of rotating and longitudinally propelling the drill string until the rotational drive assembly 124 is at the bottom of the track. At this point, the operator positions switch 220 and the front vice is applied to the drill string at ~~[[step]]~~ steps 612 and 613. The operator then reverse rotates the drive chuck 123 with the rotational drive assembly 124 and reverses the longitudinal driver to break the joint between the drive chuck 123 and the drill string 22, and then moves the rotational drive assembly 124 to the top of the track at step 614. Once the rotational drive assembly 124 is positioned at the top of the track, the operator can observe that the next rod is loaded onto the rod transfer arms, as the mechanism is in the position as illustrated in Fig. 7E, and depress the start button 226 at step 616. The rod transfer mechanism then starts the unload rod sequence at step 618, transferring a rod by extending the transfer arms into the position illustrated in Fig. 7D. The operator then forward rotates and moves the rotational drive assembly 124 longitudinally down the track to thread the drive chuck 123 into the new rod 20 and the new rod 20 into the drill string 22 at step 620. Once the joints are properly made-up, the operator positions switch 220 to release the front vice at step 622. The front vice is released at step 625. In addition to releasing the front vice, the action of positioning switch 220 also signals the rod transfer mechanism to complete the unload rod sequence at step 624. The operator can then simultaneously rotate and propel the rotational drive assembly 124 along the track with the longitudinal driver to continue drilling at step 626.

Please replace the paragraph beginning on page 16 at line 25 with the following paragraph:




Looking now at the backreaming cycle with the second embodiment illustrated in Fig. 15, the backreaming cycle will begin at step 548 when the operator has selected the



backreaming/pullback with sequence switch 228 of the left hand control arrangement. The process then continues as the rotational drive assembly 124 is propelled to the top of the track 122 while rotating the drill string at step 550. At this point, it is furthest away from the vices 150 and will have effectively pulled the drill string 22 back the length of one rod 20. At this point, the operator depresses button 320 at step 552 and the front vice 152 grips and holds the drill string 22 at step 556. At step 558, the operator holds down button 320, which or may not have been released at step 552. Holding button 320 will cause the rear vice to grip and rotate the rod at step 560. The operator will visually confirm that rear vice clamp has rotated rod 20 and broken the joint between the rod 20 and drill string 22. The operator can release button 320 at step 562 which will result in the rear vice opening and reversing its previous rotation, back to its home position at step 564. If the joint between the rod and the drill string is not broken the operator can depress button 320 as in step 558 again to attempt to break the joint. If the joint is broken, the operator controls the rotational and longitudinal drivers at step 566, rotating the rod 20 while moving or allowing it to move longitudinally to completely unthread that connection. Once the threaded connection between the rod 20 and the drill string 20 is completely separated, the operator depresses button 322 at step 568 and the rear vice 154 again clamps the rod 20 at step 570. The operator's action at step 568 also initiates the load rod sequence of the rod transfer mechanism at step 554. Initiation of the rod load sequence causes the transfer arms 137 to be moved from the position of Fig. 7F to the position of Fig. 7C. In the position of Fig. 7C, the arms 137 are poised to support the rod 20. The rotational drive assembly 124 is then reverse rotated and moved or allowed to move longitudinally to completely separate the threaded connection between the rotational drive assembly 124 and the rod 20 at step 572. At this point the rod 20 is completely supported by the transfer arms 137 and it is appropriate for the operator to visually check to insure that the rod is in good condition and that it is properly positioned on the rod transfer mechanism. The operator can then depress the button 324 at step 574 to release the rear vice at step 575 and the transfer arms 137 withdraw at step 576 to position shown in Fig. 7E, transferring the rod 20 towards the rod box 24. The load rod sequence is completed at step 576 such that the rod 20 is moved to the magazine for storage.

Please replace the paragraph beginning on page 18 at line 24 with the following paragraph:



The drilling process is illustrated for the second embodiment in Figs. 17 and 18. The process that the operator performs can be viewed as beginning in Fig. 17 when the sequence switch 228 is positioned to the drilling process at step 648. It continues at step 650 with the operator performing the actual boring process of rotating and longitudinally propelling the drill string until the rotational drive assembly 124 is at the bottom of the track. At this point, the operator depresses button 320 and the front vice is applied to the drill string at steps 652 and 654. The operator then reverse rotates the drive chuck 123 with the rotational drive assembly 124 and reverses the longitudinal driver to break the joint between the drive chuck 123 and the drill string 22, then moves the rotational drive assembly 124 to the top of the track at step 656. The front vice continues to grip the drill string. Once the rotational drive assembly 124 is positioned at the top of the track, the operator can observe that the next rod is positioned to be transferred, as the rod transfer mechanism is in the position as shown in Fig. 7F. The operator then depresses the button 322 at step 658, which causes the rod transfer mechanism to start the unload rod sequence at step 660 by raising the lifters and extending the transfer arms carrying a new rod into alignment with the drill string as shown in Fig. 7C. The operator then forward rotates and moves the rotational drive assembly 124 longitudinally down the track to thread the drive chuck 123 into the new rod 20 and the new rod 20 into the drill string 22 at step 662. Once the joints are properly made-up the operator depresses button 324 at step 664, and the rod transfer mechanism completes the unload rod sequence at step 666. The operator can then depress button 326 at step 668 that causes the front vice to release the drill string at step 670. Once the front vice has released the drill string the operator can simultaneously rotate and propel the rotational drive assembly 124 along the track with the longitudinal driver to continue drilling at step 672.